WATER MANAGEMENT
IN
SANTA CLARA COUNTY, CALIFORNIA

A PERSPECTIVE

By

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Presented at the

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Santa Clara Valley Water District

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Ronald R. Esau [a]/

INTRODUCTION

The District

The Santa Clara Valley Water District (District) is a public agency established by special act of the state of California legislature to provide overall flood protection and water supply to Santa Clara County residents. The District was originally organized for local water management in 1929, but presently operates as a multi-purpose special district under legislation passed in 1951.

The District encompasses all of Santa Clara County, which is known as "Silicon Valley" for its dynamic economic and technological development in the electronics and semiconductor industry. Steady population growth, industrialization and urbanization have caused a decline of agricultural activities and farm employment in the County. Nevertheless, farm production values have remained relatively stable in recent years. The top three farm commodities -- cut flowers, mushrooms, and nursery stock -- are crops maintaining stable levels of employment, free of the seasonality often found in agricultural production.

Paper presented by R. R. Esau on September 26-29, 1988 at the Scientific and Technical Information Institute, Ministry of Water Resources and Electric Power, in Beijing, China.

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a/SANTA CLARA VALLEY WATER DISTRICT
Assistant General Manager

The District is comprised of 15 cities, the largest being the City of San Jose which is located 48 miles south of San Francisco. Population is estimated to be approaching 1.5 million, with an assessed property valuation of $75.8 billion for fiscal year 1987-88. The boundaries of the District encompass approximately 1,316 square miles.

As a multi-purpose agency, the District has broad powers relating to all aspects of the control of flood and storm waters. It is also responsible for the storage and distribution of water for use within its jurisdictional boundaries and is obligated to provide sufficient water for present and future beneficial use by the lands and inhabitants of the District.

The District is governed by a seven-member Board of Directors, which meets in formal session on a weekly basis. Five of the Board members are elected, and two are appointed by the Santa Clara County Board of Supervisors to represent the District at large. The term of office of directors is four years. Figure 1 depicts the current organizational structure of the District.

Santa Clara Valley - The Setting

The Santa Clara Valley is located in what is known as the San Francisco Bay Area in Northern California (see Figure 2). It is an intermediate valley in the Coastal Range of California, between the Santa Cruz Mountains and the Gabilan Range on the west, and the Diablo Range on the east. The valley extends in a southeasterly direction from San Francisco Bay to the Pajaro River, a distance of approximately 50 miles. The valley varies in width from about 14 miles in the northern portion to less than a mile near the midpoint, and to about 5 miles in the southern portion.

The highest peak in the Santa Cruz Mountains is Loma Prieta, with an elevation of 3,798 feet. Copernicus Peak (elevation 4,372 feet) and Mount Isabel (elevation 4,223 feet) are the highest points on the Diablo Range in Santa Clara County. Owing to ample precipitation, native vegetation

in the Santa Cruz Mountains is dense, ranging from redwoods, firs, oaks and chaparral. Lesser amounts of precipitation in the Diablo Range result in less timber growth than in the Santa Cruz Mountains.

The climate is generally mild, and is characterized by dry summers with moderate to high daytime temperatures and cool nights, and wet winters with moderate temperature. More than 80 percent of the precipitation occurs during the five-month period from November through March.

Precipitation in the Santa Clara Valley occurs almost entirely as rainfall, although snow occasionally occurs on the higher surrounding mountains. Precipitation varies over wide limits from a mean seasonal depth exceeding 50 inches in areas of the Santa Cruz Mountains to only 13.7 inches at San Jose.

Geologic features of the groundwater basin underlying the Santa Clara Valley are of major importance and consequence to the District. Upper quaternary sediments are the main source of groundwater in the Valley. These sediments consist of flood plain deposits, alluvial fan deposits, and tideland or marine swamp deposits, of which the alluvial fan and tideland deposits form the largest part. The sediments include up to 1,000 feet of poorly sorted gravel, sand and clay. Gravels are the main aquifers from which wells extract major water supplies for domestic, industrial and agricultural purposes.

The floor of the valley ranges in elevation from sea level along the southern tip of San Francisco Bay to about 450 feet. The hill land elevation rises to over 900 feet. The north and south valley subareas are separated into two drainages by an alluvial divide near the town of Morgan Hill. North Santa Clara subarea is drained by Coyote Creek, Guadalupe River, and other minor streams, all of which flow into San Francisco Bay. The south subarea is drained by the Pajaro River and its tributary streams into Monterey Bay.

FLOOD PROTECTION

The Flooding Problem in Santa Clara County

There are about 700 miles of flood flow carrying streams and rivers in Santa Clara County. Of these floodways, about 300 miles are inadequate to carry the 1 percent flood (i.e., the flood that has 1 percent chance of occurring in a given year). In the event of a 1 percent flood, the damage countywide would exceed $620,000,000 based on June 1986 land values and flood damage estimates. Flooding would effect 64,000 residences, 4,300 business, and 8,000 acres of agricultural land. The map in Figure 3 shows the areas subject to flooding from a 1 percent flood and the total damage resulting from such a flood is summarized for each of the five flood control Zones in Table 1.

Flood Control Projects - Prioritizing and Scheduling

Flood control projects are designed and constructed to provide protection from damage from the 1 percent flood. The District has prioritized these projects based on eight separate criteria that were established with the assistance of Flood Control Zone Advisory Committees in the mid-1970s. The primary and most heavily weighted criterion is the amount of flood damage (in dollars) that could be avoided if the facility were constructed or implemented.

Projects are generally scheduled in the order of their priority ranking except for two cases. If the project is a cooperative project with a city, the County or federal government, project schedules are shifted to accommodate the project timing of the cooperating agency. Project scheduling is also shifted out of the priority ranking if, by constructing the project, the District would induce a greater level of flooding downstream. Rather than induce downstream flooding, the District would schedule a required downstream improvement first (even though it may have a lower priority based on other criteria) and then proceed with the upstream project.

Because flood control projects can range in cost from hundreds of thousands to tens of millions of dollars, project funding is a major constraint

that affects the scheduling of flood control projects. For the most part the District has prepared its flood control construction schedules based on pay-as-you-go funding. That is, the District schedules the next highest priority project once sufficient cash is projected to be accumulated to fund its construction. Funding-related delays result when there is a decrease in anticipated revenue, when a project cost increases significantly over earlier estimates, when a project that had been scheduled as a federal project is not approved for federal funding or when an unanticipated event occurs that requires use of limited construction funds, such as major maintenance repairs needed as a result of storm damage.

Flood Control Zones

To address the flood control needs on a drainage basis, the District is divided into five flood control zones. These zones approximately conform with the major watersheds affecting the valley floor. Each zone has a separate flood control program and each operates as a separate fiscal entity, with its own revenues and expenditures.

Existing Flood Control Facilities

The District has been constructing flood control works since 1951. The major flood control facilities include more than 700 miles of levees, pipelines, channels and natural waterways and numerous special flood control features. The estimated cost of replacement of the improvements to these facilities is about $200 million, not including the ten water conservation dams which provide incidental flood damage reduction. The annual cost to maintain existing flood control facilities is about $6 million per year.

New Flood Control Facilities

In addition to existing flood control facilities, over $500 million of new facilities are needed to provide protection from the 1 percent flood. The federal projects which are currently in progress or under feasibility study could account for nearly $140 million of this amount. The District is the sponsor of five projects being developed by the federal Corps of Engineers

and three projects by the federal Soil Conservation Service. Each zone has its own prioritized schedule of needed facilities.

FLOOD CONTROL ZONE FUNDING

District Funding Sources

The flood control zones have two primary sources of annual revenue. They are allocated property taxes and benefit assessments. The zones, as noted above, also actively seek federal projects to help provide needed local flood protection. As a general practice, the flood control program operates on a pay-as-you-go funding basis from the sources described.

Ad Valorem Taxes

Each of the flood control zones receives a portion of the District's share of a one percent countywide ad valorem tax based upon its respective assessed valuation. This source generated $9.5 million (1985-86), $10.9 million (1986-87) and $11.0 million (1987-88) during the last three years.

Benefit Assessment Program

The District's Board of Directors first levied benefit assessments in June of 1981 to provide an increased level of flood protection in each of the flood control zones. The goals of the program were to provide sufficient funds to double the maintenance program and provide for construction of new projects that would reduce flood damage as identified in 1980 by approximately 60 percent. The damages were based on 1980 property values and assumed that the then identified federal projects would be constructed by the federal government and that normally anticipated reimbursements for the local share of federal projects would continue through the state subventions program.

The benefit assessment program was levied in accordance with then existing state legislation that had been passed to assist flood control districts

in providing funding for local programs. In order for the benefit assessment program to continue after 1981-82, the law required voter approval within the year. In June 1982, the voters, in an election within the five combined flood control zones, approved continuation of the program by over 73 percent. This source generated $7.6 million (1985-86), $7.7 million (1986-87) and $15.6 million (1987-88) during the last three years. State law permits spreading assessments according to proportional storm water runoff from the different land uses. On this basis, the District determines the assessments for each of approximately 385,000 parcels of property in the flood control zones. Each parcel is assessed according to its area and its estimated relative amount of storm water runoff based upon its land use. Under the District's program, properties have been grouped into five main land use categories. These categories and their corresponding assessment rates are presented in Table 2.

During the seven-year period since the inception of the benefit assessment program in 1981, the District has been able to meet its goal of providing increased flood control maintenance and of accelerating its needed construction program. Total local construction since then has amounted to over $55 million.

WATER UTILITY

History of Water Use

Water has played a large and important role in the development of the Santa Clara Valley since the first settlers arrived over 200 years ago. With the founding of Mission Santa Clara de Asis along the Guadalupe River by Franciscan padres in 1777, the valley was given its name. Later that same year, Pueblo de San Jose was founded nearby, making it the first civil settlement in California.

The valley has had four distinct periods of economic development and land use: cattle raising, grain farming, fruit production, and the present period of industry and urbanization. In the early 1800s, cattle ranching was the principal activity. Later cattle ranching gave way to grain farming.

By 1870, the prune became nationally popular, and valley farmers began intensive production of this and other deciduous fruits. Subsequently, the Santa Clara Valley became known as the dried fruit and the canning fruit center of the world. By 1930 the acreages of fruit and nut trees increased tremendously to 110,000 acres. The water required to irrigate the orchards had a dramatic impact upon the underground-water resources of the valley.

The present municipal and industrial period began with the large influx of families and industry following World War II. The population surged to 291,000 in 1950 and by 1965 had more than tripled to over 900,000. This growth in population, in addition to a 40 percent increase in per capita water consumption, created a phenomenal increase in total water demand. By 1970, the water requirements of the north valley alone were nearly 250,000 acre-feet (308 cubic hectometers).

In 1950, most of the valley's water requirements were met by water pumped from the underlying groundwater basin. This stress on the basin sent water levels to an all-time low of over 150 feet (46m) below the ground surface. To attempt to replenish the depleted groundwater supply, the District constructed ten conservation reservoirs with a combined capacity of over 160,000 acre-feet (185 hm^3). The reservoirs capture the runoff from winter rains and store the water until it can be released into streams and spreading ponds for recharge of the groundwater basin.

The initial stages of the Hetch Hetchy Aqueduct were constructed by the City of San Francisco in 1934-35. In 1952 this system was expanded to include pipelines across and service to northern Santa Clara Valley. Hetch Hetchy now serves water to Sunnyvale, Palo Alto, Mountain View and Milpitas, and a minor amount to the City of San Jose. This District plans for long-range imports in the amount of 80,000 acre-feet from this source.

When it became evident that the combination of local water supplies and Hetch Hetchy could not meet the water demands, plans were made to acquire additional water from sources outside the valley. The District contracted

with the state of California in 1961 to receive 100,000 acre-feet (123 hm^3) per year through the South Bay Aqueduct of the California Water Project. Deliveries to the north valley began in July 1965. More than half of this state water is treated for surface distribution, with the remainder used for artificial recharge of the groundwater basin. In 1977 the District contracted with the United states Department of the Interior to receive up to 152,500 acre-feet per year through the San Felipe Division of the Central Valley Project. Initial water deliveries from this source began in June 1987. It is anticipated that the District's water supply is basically adequate to meet projected needs through the year 2020.

Most of the increase in water demands is now supplied by treated imported water, and groundwater production has remained relatively constant at approximately 150,000 acre-feet (185 hm^3) per year. Groundwater supplied more than 96 percent of the water needs of the valley in 1950. In the south county area, all of the needs are still met from groundwater, while in the north county area, groundwater now supplies only 60 percent of the total water demand.

Existing Facilities

The District's present In-County Water Distribution System has four principal components, which are:

Sources of Supply:

Raw Water Conveyance Facilities, consisting of streams, canals and pipelines;

Groundwater System, with its recharge facilities, and

Surface Water Treatment System.

Sources of Supply

As noted previously, due to the increasing water requirements in the District, it has been necessary to not only develop existing local water supplies but also to import additional supplies. The District has five existing sources of water supply: 1) natural and recharged groundwater, 2) surface reservoirs, 3) imported water from the South Bay Aqueduct of the State Water Project, 4) imported water from the San Felipe Division of the federal Central Valley Project, and 5) water imported through the Hetch Hetchy Aqueduct of the City of San Francisco. Figure 4 shows the major facilities of the District's In-County Water Distribution System and the sources of imported water. Figure 5 indicates the location of the District's ten local reservoirs and the northern California water systems which provide imported water, as noted.

(1) Natural Groundwater Yield

Three major interconnected groundwater subbasins exist within the District. The groundwater subbasins together occupy about 240,000 acres of the 849,000 total acres in the District, and have a total natural yield of approximately 162,000 acre-feet per year. This natural yield is that amount of local water, exclusive of controlled releases from surface reservoirs, that flows or seeps into the aquifers of the groundwater subbasins.

Overpumping of the groundwater subbasins causes such related problems as land surface subsidence and increased pumping costs, and increases the potential for saltwater intrusion from the San Francisco Bay. A program for recharging the subbasins was implemented nearly 60 years ago to alleviate these problems on a long-term basis. Figure 6 charts historical population, depth to water, and land surface subsidence during the period 1910 to 1984.

(2) Surface Reservoir Yield

Surface water is a primary source of water for groundwater recharge in the District. The ten storage reservoirs have been constructed on the major

streams to retain seasonal runoff which later is released for groundwater recharge and some irrigation. The long-term average operational yield available collectively from these reservoirs is approximately 75,000 acre-feet per year.

(3) Imported Water - State Water Project

Overall, thirty contracting agencies throughout California make up the State Water Project service area. The District is one of three public agencies which import untreated water through the South Bay Aqueduct. Presently the District is entitled to 88,000 acre-feet per year, increasing beginning in 1989 up to a maximum 100,000 acre-feet in 1994.

(4) Imported Water - Federal Central Valley Project

Via the San Felipe Division of the Central Valley Project, authorized by Congress in 1967, the District will import the entire amount of supplemental water required to meet the projected needs through the year 2020. This system was completed last year by the Bureau of Reclamation, United States Department of the Interior, and will ultimately serve supplemental water to four counties. Through the sale of water to these counties, the federal government will ultimately recover all its costs, contractually over a forty-year period. The District has contracted for a maximum delivery of 152,500 acre acre-feet per year, the large majority to be used for municipal and industrial purposes.

(5) Imported Water - San Francisco Water Department

The fifth major source of supply to Santa Clara Valley is the Hetch Hetchy Aqueduct which conveys water from the Sierra Nevada Mountains to users in the San Francisco Bay area. The first contract in the District was executed in 1952. At present approximately 66,000 acre-feet of water is annually delivered in the north valley area from this source. Deliveries to the District are expected to increase to an estimated 75,000 to 80,000 acre-feet per year by 2020.

Raw Water Conveyance Facilities

To transport imported water as well as local conserved water for treatment and/or groundwater recharge, the District has constructed a raw water conveyance system to supplement the natural channels and streams. The conveyance system is comprised of canals, pipelines and pumping facilities throughout the District.

The Groundwater System

The groundwater system consists of the groundwater subbasins and the on-stream and off-stream recharge facilities associated with each subbasin. As previously discussed, this system has three interconnected subbasins which annually transmit, filter, store and yield approximately 60 percent of the water needs of the north valley and 100 percent of the needs of the south valley.

In the last few years, Santa Clara Valley has been the focus of state and federal attention in the area of hazardous materials regulations. The discovery of a major groundwater contamination incident in 1981 set in motion a local regulatory response that has been the pattern for similar action throughout the state of California. Responsible agencies have forged new concepts with regard to remedial actions associated with existing incidents of contamination. Now that cleanups are in progress at over 125 industrial sites in the valley, difficult decisions with regard to the level of cleanup to be required must be faced.

In 1981, a large electronics firm reported the loss of about 60,000 gallons of waste solvents and water from an underground storage tank farm. Thereafter, a nearby well of a water utility company was shut down after detecting contamination with trichlorethane (TCA) at a concentration of 5,800 parts per billion (ppb).

During the next year, the state conducted extensive surveys of all industry that might have underground solvent storage tanks on their property. Fuel

products were omitted from the initial survey. Solvents were considered a higher priority because of their extreme toxicity, their higher solubility in water, their specific gravity, and their persistence, or resistance to biochemical degradation, as compared to petroleum products. In the survey, it was found that a significant number of the companies had leaks or spills on their property which warranted further investigation.

This discovery concurrently set in motion a response from local regulatory agencies which resulted in the adoption of the nation's first Hazardous Materials Storage Ordinance (HMSO). It went on to become the model after which the California state regulations were patterned. The HMSO had two primary purposes: 1) to insure the safe storage and on-site handling of hazardous materials, and 2) to protect the quality of the underlying groundwater. It requires soil sampling around all tanks to detect past leaks as well as periodic monitoring to detect future leaks at an early stage before major soil and/or groundwater contamination can occur. Through the implementation of the HMSO, a number of new cases of solvent contamination have been discovered along with numerous instances of petroleum product contamination.

Today the state is overseeing the investigation of over 125 groundwater contamination cases. In addition, there are over 350 cases of petroleum product contamination uncovered so far that are receiving attention by a special program funded by the District. As the remedial actions at the solvent contamination sites proceed, the state is rapidly approaching a most difficult decision -- that is, to what levels should contamination in the soil and groundwater be reduced. These decisions are not only technically complex, but are further complicated by economic, political and value considerations introduced by a concerned public rightfully involved in the process.

Surface Water Treatment System

To supplement the natural treatment process provided by the groundwater subbasins, the District has constructed and operates three major water

treatment systems to meet the water demands of the local area. The Hetch Hetchy Aqueduct also delivers potable water to the District's service area.

The District's three existing treated water systems are the Rinconada Water Treatment System (70 million gallons per day), Penitencia Water Treatment System (40 million gallons per day), and the newly constructed Santa Teresa Water Treatment System (100 million gallons per day).

Water Distribution System Expansion

As additional imported water supplies have been secured by the District, the In-County Distribution System has been undergoing expansion to treat and distribute the water. In 1975, the District prepared a detailed Master Plan describing projects to meet projected needs through the year 2020. The construction program of new facilities needed to meet projected water requirements has been recently updated to meet changing conditions. This updated program provides the basis for the major projects to be constructed by 1990, as described in Table 3.

WATER UTILITY FUNDING

District Funding Sources

Budgeting for the District's Water Utility Program is accomplished on an enterprise fund basis. Water supply activities are partially financed by an allocation of a Districtwide tax to pay for the cost of importation facilities and for recreational benefits derived from the District's reservoirs. The major sources of water supply income are a charge levied on all groundwater extracted from the subbasins, and from the sale of treated water. Other sources of revenue include interest from invested funds, additional tax allocations, sale of surface-delivered untreated water, and sale of reclaimed water. The District has utilized proceeds from the sale of long-term revenue bonds as a partial financing mechanism for construction of new facilities.

Water Pricing Policy

The current water pricing policy of the District was adopted by its Board of Directors in 1971. The policy incorporates two basic concepts in water resources management: 1) a water pooling concept in which water for a given zone of benefit is considered a single commodity with a uniform value regardless of source or cost and 2) a water management concept in which the user pays for benefits received.

Where it is possible to determine the benefits a user receives directly, the pricing policy establishes water charges. The District's major water charges are:

A groundwater charge and equivalent basic user charge, which are associated with the benefit of water consumption. The groundwater charge is an excise tax applied to water extracted from the groundwater basin in groundwater charge zones, while the basic user charge is applied to other types of water delivered by the District. There are two rates, one for agricultural (Ag) water and one for municipal and industrial (M&I) water. Revenue from these charges pays for the general costs of providing water and for the capital costs of constructing

in-county facilities either through "pay as you go" financing or through debt repayment of bonds and loans.

A treated water surcharge, which is associated with the benefit of receiving treated water. It is levied in addition to the basic user charge on water delivered from the District's water treatment plants.

Several benefits are general in nature serving all or large areas of the county. Some of these benefits are the availability of imported water to the County, recreation associated with the District's reservoirs, and the replenishment of the County's groundwater subbasins which has halted land surface subsidence and which provides a supply of water in drought periods.

The District receives a portion of the one percent Countywide tax revenues as allocated by the County Assessor based on pre-1978 District tax levies. The District also levies additional ad valorem taxes under Article XIII A of the state Constitution for the purposes of a) paying prior approved general obligation bond debt service and b) meeting part of the contractual obligations to the state for South Bay Aqueduct water. The District's major debt service taxes are levied in Zones W-1 and W-6 while the State Water Project Tax is levied Countywide.

Figure 7 locates the major water utility zones. Zones W-1, W-3, W-4, and W-6 are associated with ad valorem taxes while Zones W-2 and W-5 are water charge zones. In fiscal year 1987-88, a groundwater charge was levied in Zone W-5, which included previous water charge Zones W-6, W-3.1, W-3.2, W-3.3 and W-3.5.

To fund the construction of new facilities the District has relied on both pay-as-you-go financing and long term debt financing from revenue bonds as authorized by the voters in 1977. The last remaining 1977 authorized revenue bonds were sold in April 1984. In January 1984, state legislation became effective which allowed the District to seek electorate authorization to issue revenue bonds as needed following the Board of Director's approval.

Santa Clara County voters approved this authorization in the November 1984 election, and the District sold an additional $30 million of revenue bonds in November 1985 to provide needed funding for ongoing projects. In August 1986, the District refunded all outstanding water revenue bonds. The refunding was for $94,935,000 at 6.8 percent interest and will generate an estimated savings of about $200,000 per year over 20 years.

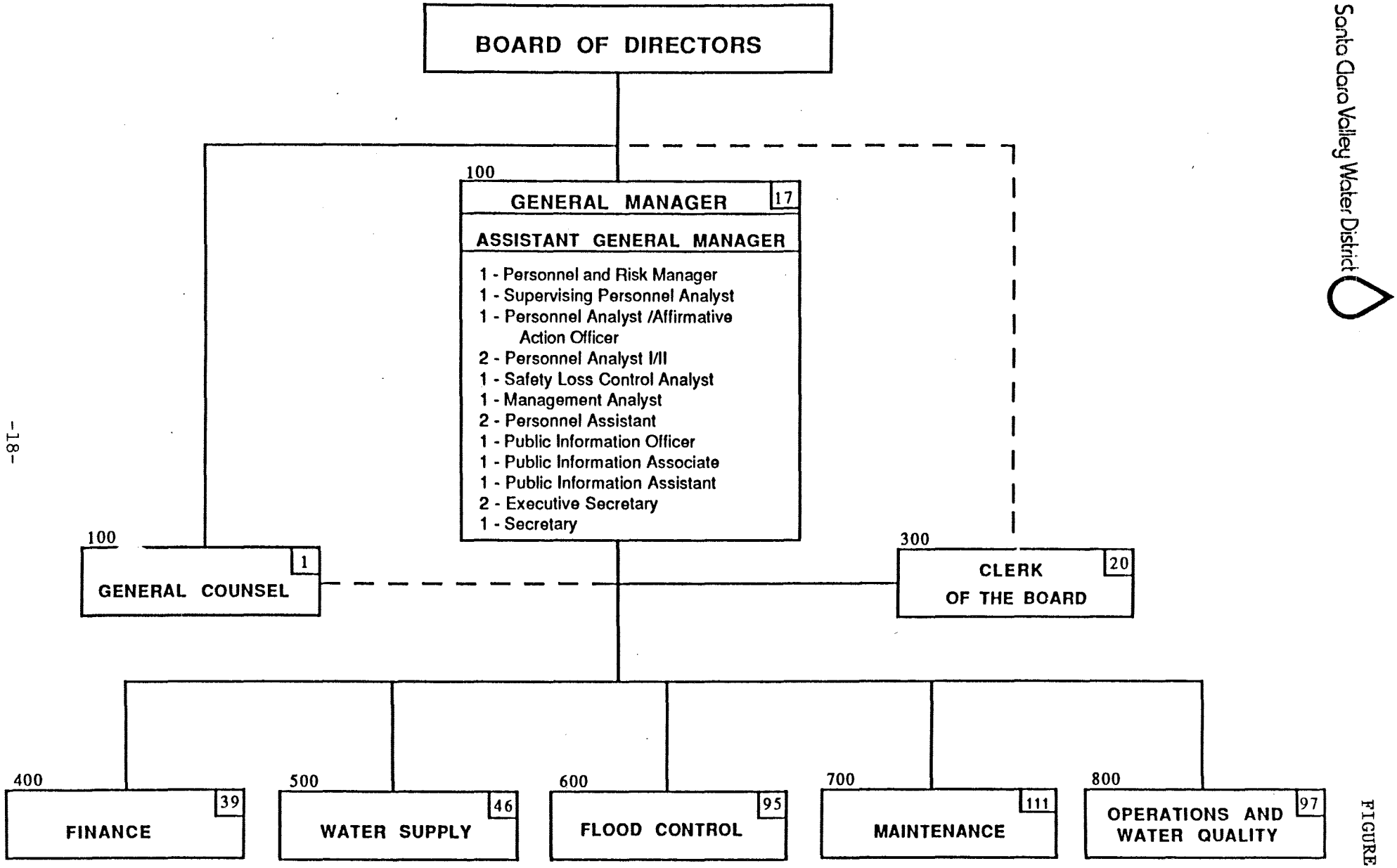
Revenues and Expenses

Total groundwater charges, treated and surface water sales, interest and tax revenues, as excerpted from the District annual audits for fiscal year 1986-87, are shown on Table 4.

SUMMARY

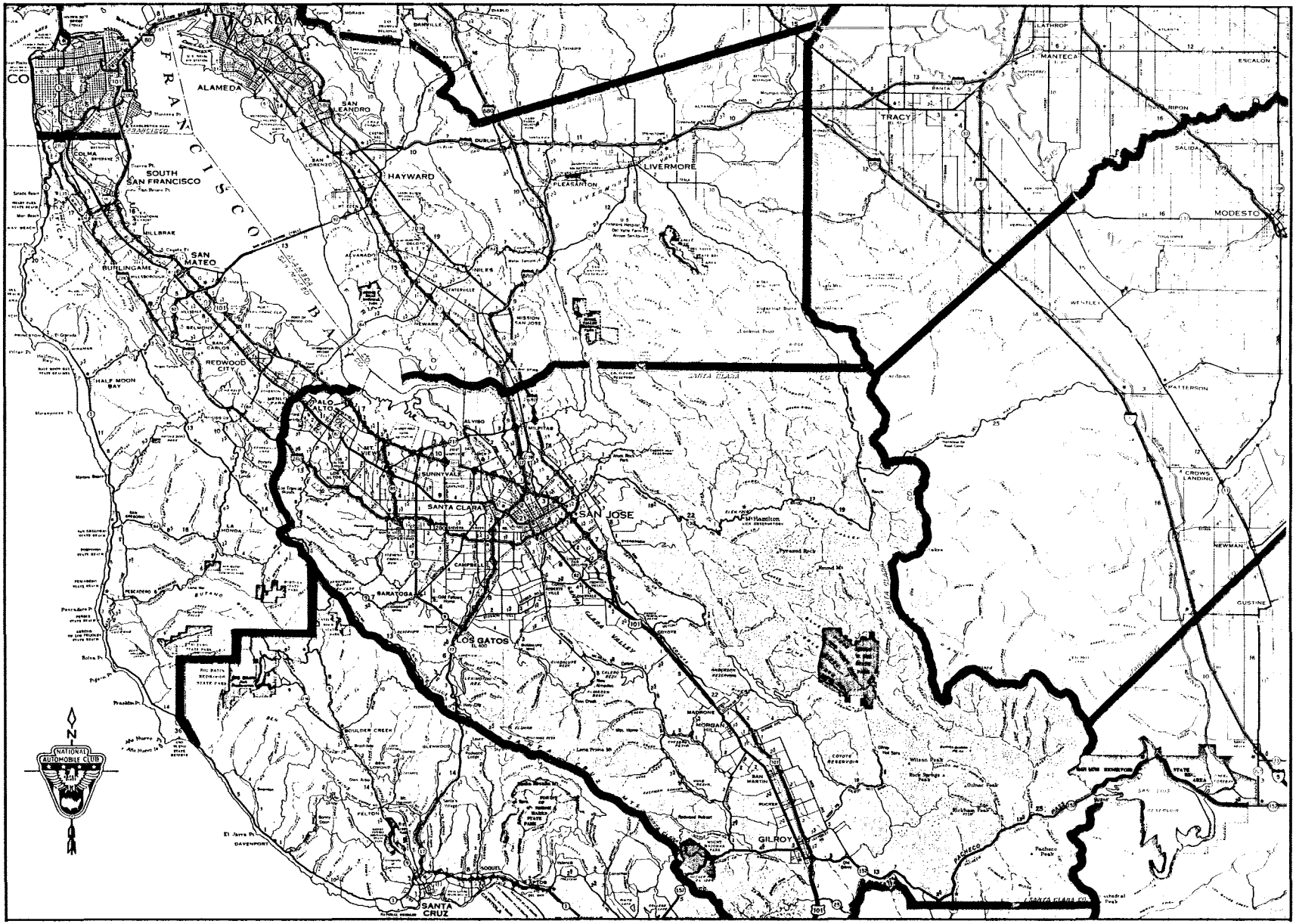
The Santa Clara Valley Water District has served as a public water management agency for nearly 60 years. During this period the District has met with and overcome many obstacles in providing water for an ever growing and changing community. As noted in **The Global 2000 Report** commissioned by the President of the United states, for the remainder of the 20th century water is going to be one of mankind's most sought after natural resources everywhere in the world. Water is required for every aspect of human life and existence. In the Santa Clara Valley and throughout the state of California, sound water management now and in the future is an absolute necessity to the well-being of all our citizens.

FIGURES



Santa Clara Valley Water District

FIGURE 1



San Francisco Bay Area—Santa Clara Valley Water District appears as the shaded area. A very small portion of the District extends beyond the lower border of the map.

Basic map reproduced by permission of National Automobile Club, copyright owner.

FIGURE 2

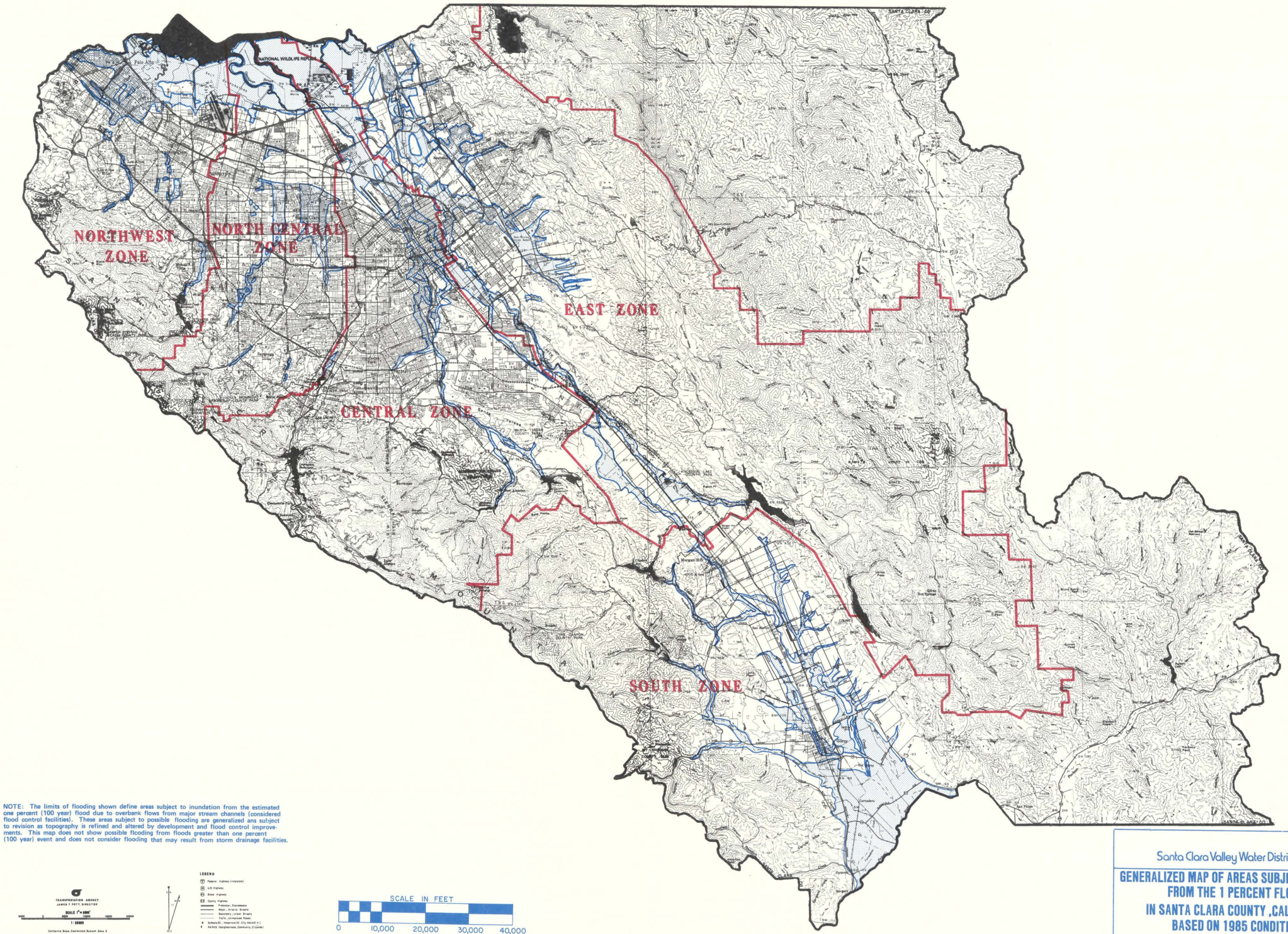

NORTHWEST ZONE
NORTH CENTRAL ZONE
CENTRAL ZONE
EAST ZONE
SOUTH ZONE
SAN JOSE
Palo Alto
Morgan Hill
Gilroy
Los Gatos
Campbell
Milpitas
Alviso
Mountain View
Los Altos
Sunnyvale
Santa Clara
Cupertino
Saratoga
Los Altos Hills
Monte Sereno
Los Gatos
Almaden Valley
Coyote
Evergreen
Alum Rock
Berryessa
Edenvale
Blossom Hill
Cambrian Park
Willow Glen
Rose Garden
Naglee Park
Shasta-Hanchett Park
Downtown
Japantown
Alameda
Stevens Creek
Lawrence
Moffett Field
Lockheed
Ames Center
Rancho San Antonio
Foothill
Permanente
Monte Bello
Black Mountain
Mt. Umunhum
Loma Prieta
Bear Creek
Lexington
Guadalupe
Almaden
Calero
Santa Teresa
Coyote Valley
Anderson
Coyote
Uvas
Chesbro
Pacheco
Henry Coe State Park
Mt. Hamilton
Isabel Valley
Arroyo Hondo
Arroyo Aguague
Arroyo Bayo
Arroyo Valley
Arroyo Quien Sabe
Arroyo Las Animas
Arroyo Del Valle
Arroyo Del Cierbo
Arroyo Del Puerto
Arroyo Del Rincon
Arroyo Del Rincon
Arroyo Del Rincon

FIGURE 4



OUR WATER SOURCES

Santa Clara Valley Water District

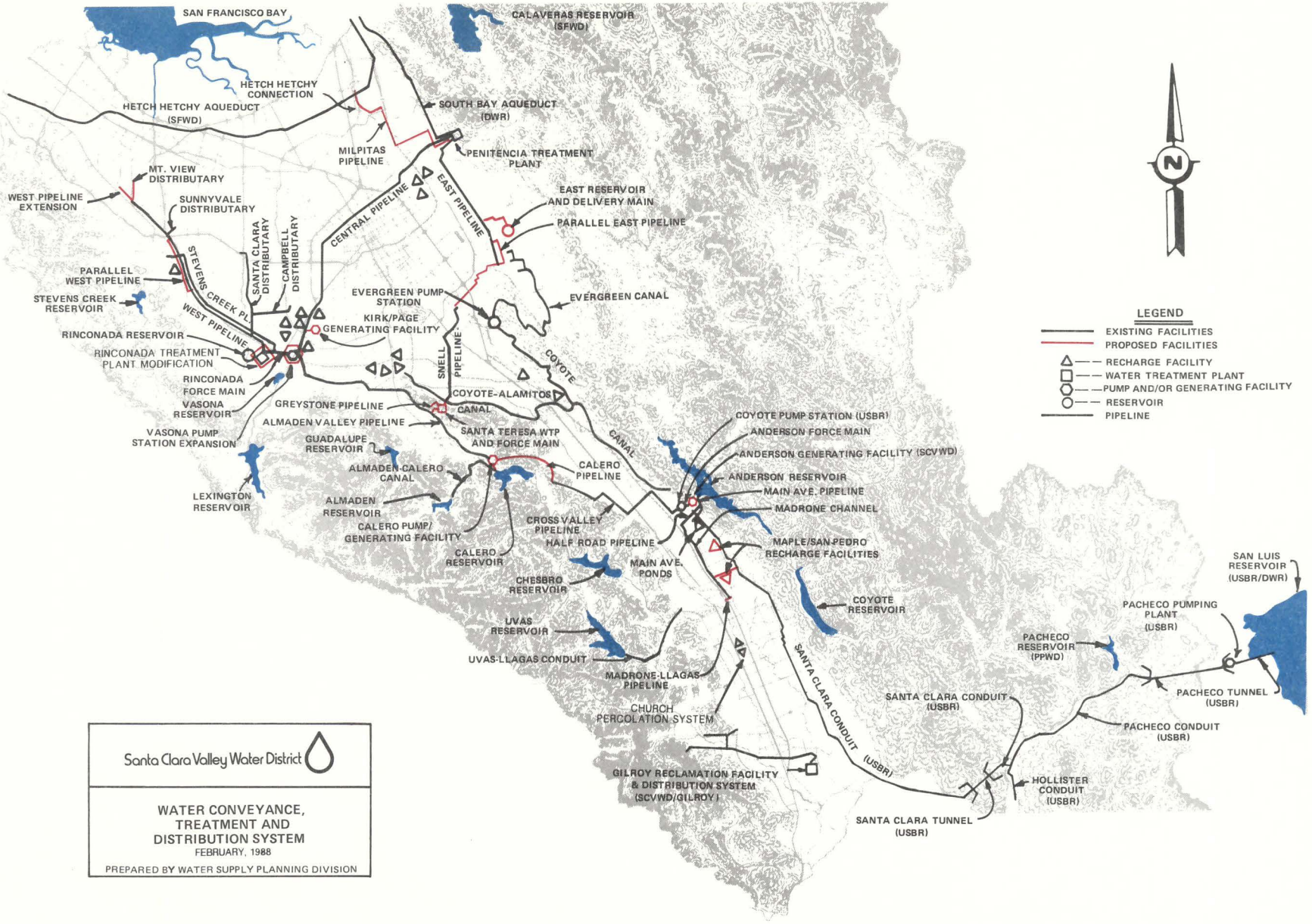
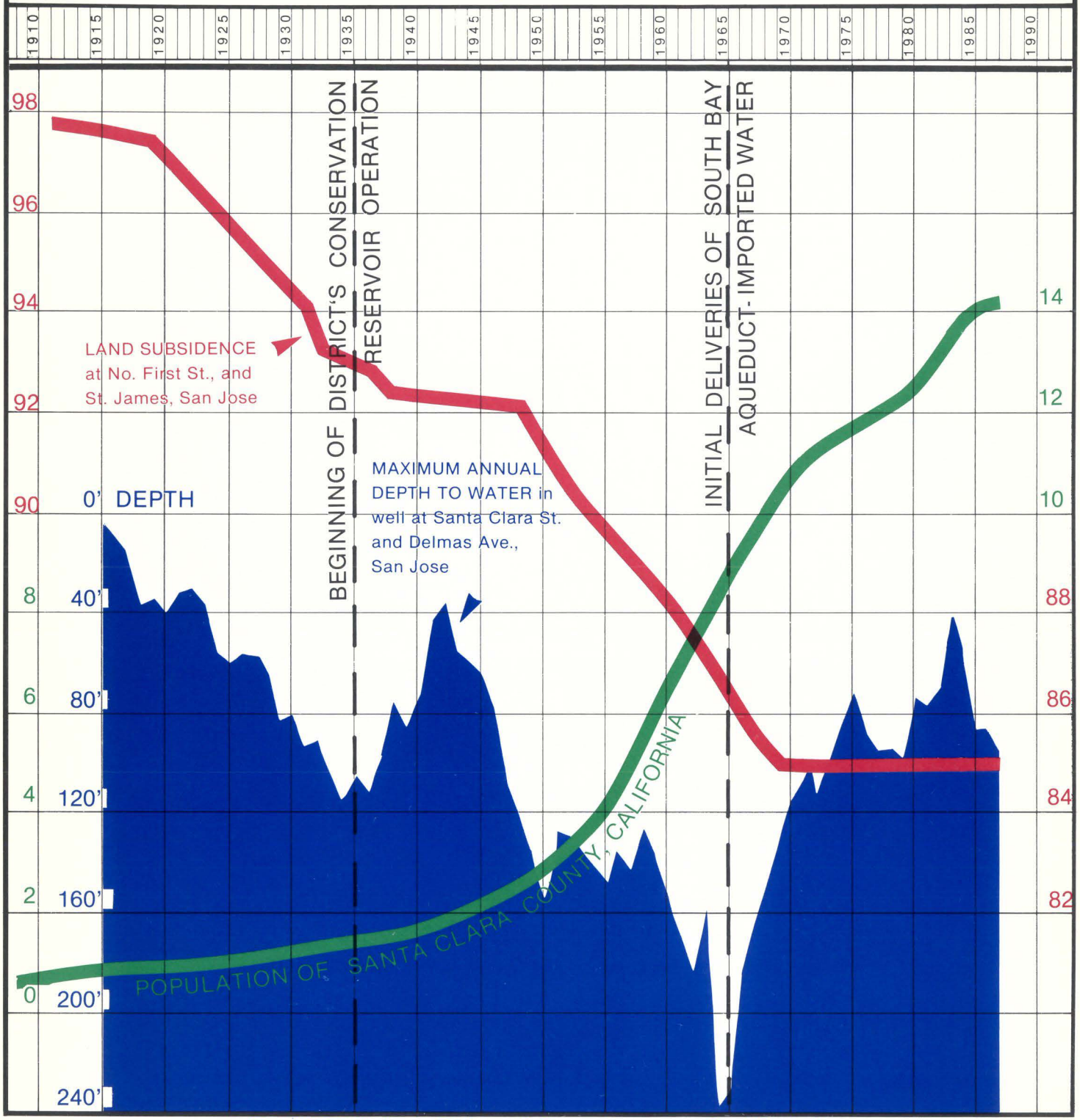

SAN FRANCISCO BAY
CALAVERAS RESERVOIR (SFWD)
HETCH HETCHY CONNECTION
HETCH HETCHY AQUEDUCT (SFWD)
SOUTH BAY AQUEDUCT (DWR)
MILPITAS PIPELINE
PENITENCIA TREATMENT PLANT
MT. VIEW DISTRIBUTARY
WEST PIPELINE EXTENSION
SUNNYVALE DISTRIBUTARY
CENTRAL PIPELINE
EAST PIPELINE
EAST RESERVOIR AND DELIVERY MAIN
PARALLEL EAST PIPELINE
STEVENS CREEK PL
SANTA CLARA DISTRIBUTARY
CAMPBELL DISTRIBUTARY
PARALLEL WEST PIPELINE
STEVENS CREEK RESERVOIR
WEST PIPELINE
EVERGREEN PUMP STATION
EVERGREEN CANAL
KIRK/PAGE GENERATING FACILITY
RINCONADA RESERVOIR
RINCONADA TREATMENT PLANT MODIFICATION
SMELL PIPELINE
COYOTE CANAL
RINCONADA FORCE MAIN
VASONA RESERVOIR
COYOTE-ALAMITOS CANAL
GREYSTONE PIPELINE
ALMADEN VALLEY PIPELINE
VASONA PUMP STATION EXPANSION
SANTA TERESA WTP AND FORCE MAIN
GUADALUPE RESERVOIR
ALMADEN-CALERO CANAL
CALERO PIPELINE
LEXINGTON RESERVOIR
ALMADEN RESERVOIR
CALERO PUMP/ GENERATING FACILITY
CROSS VALLEY PIPELINE
HALF ROAD PIPELINE
CALERO RESERVOIR
CHESBRO RESERVOIR
MAIN AVE. PONDS
UVAS RESERVOIR
UVAS-LLAGAS CONDUIT
MADRONE-LLAGAS PIPELINE
CHURCH PERCOLATION SYSTEM
GILROY RECLAMATION FACILITY & DISTRIBUTION SYSTEM (SCVWD/GILROY)
COYOTE PUMP STATION (USBR)
ANDERSON FORCE MAIN
ANDERSON GENERATING FACILITY (SCVWD)
ANDERSON RESERVOIR
MAIN AVE. PIPELINE
MADRONE CHANNEL
MAPLE/SAN PEDRO RECHARGE FACILITIES
COYOTE RESERVOIR
SANTA CLARA CONDUIT (USBR)
SAN LUIS RESERVOIR (USBR/DWR)
PACHECO PUMPING PLANT (USBR)
PACHECO RESERVOIR (PPWD)
PACHECO TUNNEL (USBR)
SANTA CLARA CONDUIT (USBR)
PACHECO CONDUIT (USBR)
HOLLISTER CONDUIT (USBR)
SANTA CLARA TUNNEL (USBR)
LEGEND
EXISTING FACILITIES
PROPOSED FACILITIES
RECHARGE FACILITY
WATER TREATMENT PLANT
PUMP AND/OR GENERATING FACILITY
RESERVOIR
PIPELINE
Santa Clara Valley Water District
WATER CONVEYANCE, TREATMENT AND DISTRIBUTION SYSTEM
FEBRUARY, 1988
PREPARED BY WATER SUPPLY PLANNING DIVISION

FIGURE 5

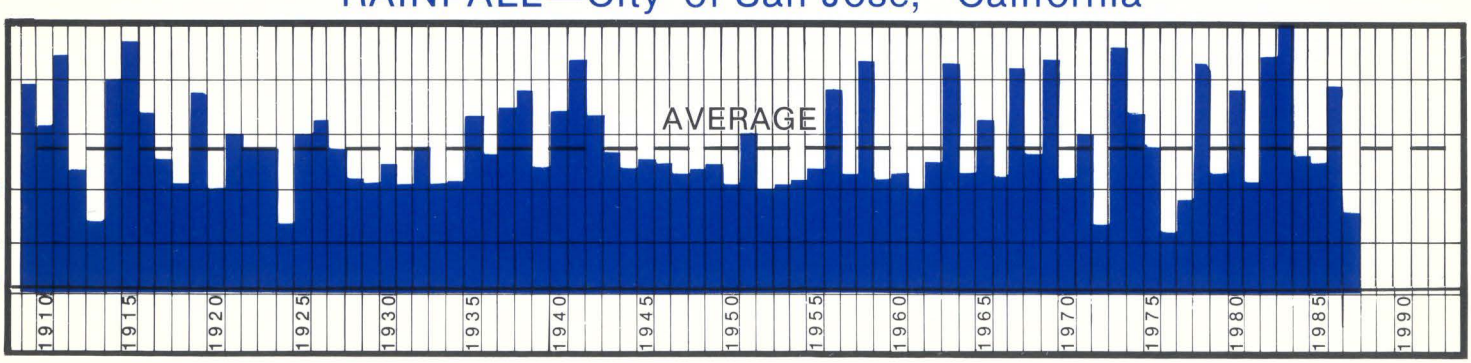
FIGURE 6

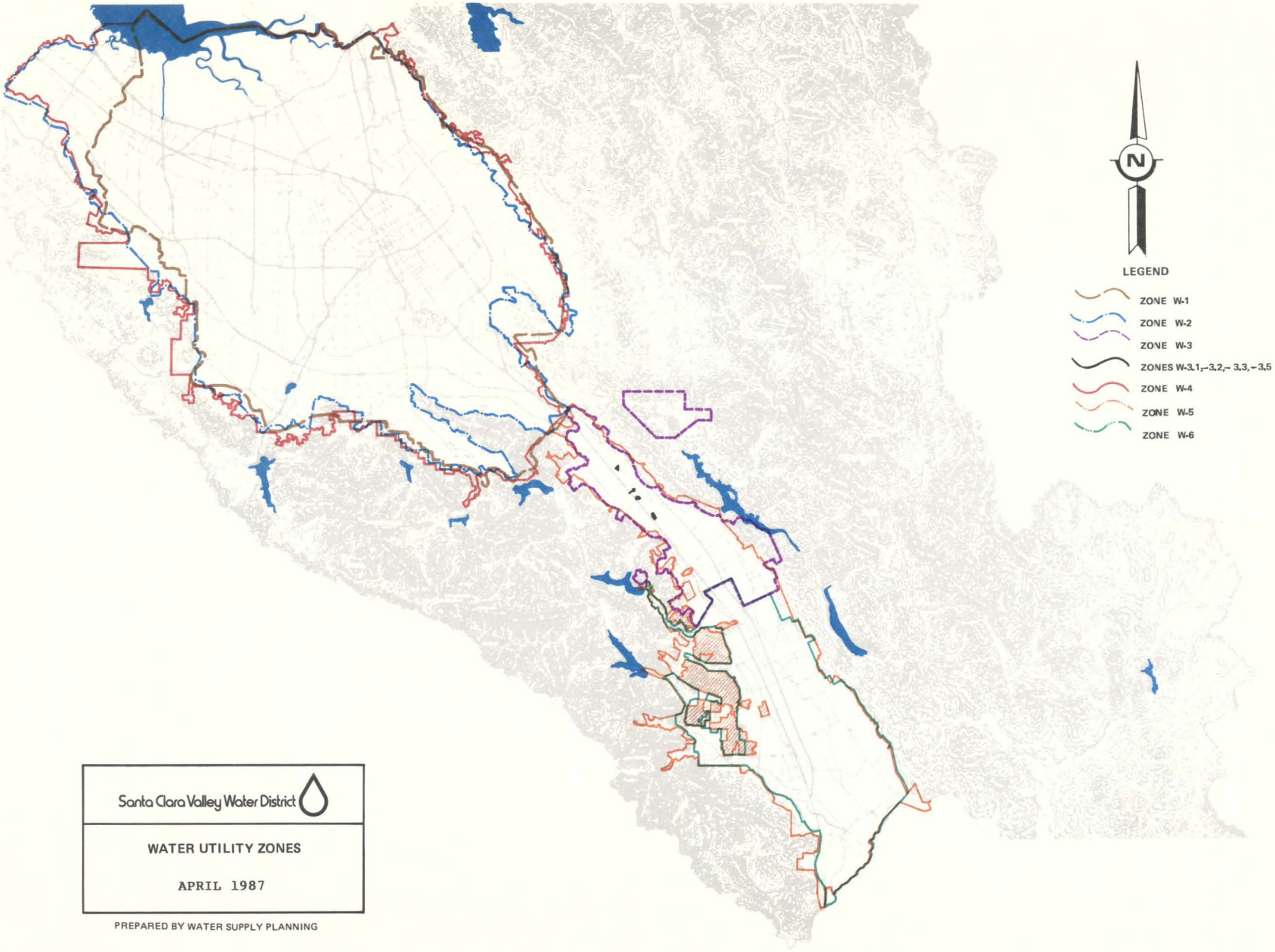
SANTA CLARA VALLEY WATER DISTRICT

AVERAGE DEPTH TO WATER, LAND SUBSIDENCE, POPULATION



RAINFALL—City of San Jose, California





Santa Clara Valley Water District

WATER UTILITY ZONES

APRIL 1987

PREPARED BY WATER SUPPLY PLANNING

FIGURE 7

TABLES

TABLE 1

SUMMARY OF POTENTIAL FLOOD DAMAGES
(1986)

Zone	Length of Creeks (Mi.)	Length of Inadequate Creeks (Mi.)	1% Damages	1% Area Flooded (Ac.)	Potential Flood Damages ($ Millions) Single Family Homes 1/	Apts.	Mobile Homes	Comml/ Indust.	Public Facilities
NW	100	54	$106,500,000	5,200	$78	$9.7	$ .0 mil	$15.5	$ 2.2
NC	85	51	123,000,000	6,700	22	12.9	0.2	85.45	1.0
C	138	48	159,300,000	11,100	67	2.8	20.0	52.71	4.9
E	206	97	205,000,000	20,100	105	11.7	18.0	65.90	2.9
S	176	111	29,100,000	20,000	19	0.4	0.0	9.0	0.1
Totals	705	361	$622,900,000 1/	63,100	$291	$37.5	$38.2 mil	$228.5	$11.1

1/ There are approximately 64,000 residences subject to flooding.

TABLE 2

1986-87 BENEFIT ASSESSMENT RATES

ZONE	NW	NC	C	E	S	
			($/Acre Per Year) [1]			
Land Uses						
A. Commercial/ Industrial	$102.09	$102.09	$100.09	$102.09	$102.09	
B. Apts./High Dens. Residential	76.57	76.57	75.07	76.57	76.57	
C. Single Family	12.74 [2]	12.74 [2]	12.50 [2]	12.74 [2]	12.74 [2]	
D. Utilized Agricultural	0.638	0.638	0.626	0.638	0.638	
E. Undisturbed Agric., Marsh Lands	0.189	0.189	0.185	0.189	0.189	
						Total
Benefit Assessment Income ($ Millions)	$1.21	$2.06	$2.34	$1.77	$0.36	$7.74

[1] Land uses A and B have minimum assessments equal to 1/4 of the per acre rates shown. Land uses D and E have minimum assessments equal to 10 acres at the rates shown.

[2] "C" category rates shown are not per acre. Rates shown are per .25-acre parcels or smaller. For larger parcels these land uses are assessed at D rates for the area above .25-acre.

TABLE 3

PROJECTED PROJECT COSTS 1985/86 THROUGH 1989/90

Facilities	Cost
Madrone-Llagas Pipeline	$ 700,000
Kirk/Page and Anderson Generating Facilities	4,500,000
Rinconada Water Treatment Plant Sludge Facility	10,200.000
Penitencia Water Treatment Plant Sludge Facility	5,200,000
Santa Teresa Water Treatment Plant and Force Main	57,100,000
Santa Teresa Tunnel	7,500,000
Snell Pipeline	28,200,000
Calero Pipeline	7,800,000
Milpitas Pipeline	6,300,000
Mountain View Distributary	1,100,000
Maple-San Pedro Recharge Facilities	12,000,000
Anderson Spillway	4,500,000
1985/86 through 1989/90 design & construction	$145,100,000 (Total)

TABLE 4

SANTA CLARA VALLEY WATER DISTRICT
WATER UTILITY ENTERPRISE

Statement of Revenues and Expenses
Under Resolution 86-63

Year Ended June 30, 1987

Operating revenue and interest:	
Ground water charges	$ 16,671,064
Treated water charges	14,536,476
Surface and reclaimed water charges	130,628
Interest	9,303,035
Total operating revenue and interest	40,641,203
Operating expenses, excluding depreciation and charge for cost components:	
Administration	1,274,239
Planning	1,095,935
Maintenance	3,631,762
Operations	9,221,070
Total operating expenses, excluding depreciation and charge for cost components, State of California, Department of Water Resources	15,223,006
Net revenues	25,418,197
Other revenue:	
Taxes	15,840,633
Rent and other	710,669
Total other revenue	16,551,302
Other expenses:	
Depreciation	1,469,957
Charge for cost components, State of California, Department of Water Resources	6,693,392
Interest on bonds payable	5,331,082
Fiscal agent fees	34,803
Loss on bond refunding	10,720,718
Total other expenses	24,249,952
Operating transfer out	(83,796)
Net income	$ 17,635,751

Resolution 86-63 of the Board of Directors of the Santa Clara Valley Water District requires presentation of net revenues (as defined by the Resolution) earned during the fiscal year which indicates the District's compliance with provisions of the Resolution.